

Application No.: 10/781,940

WAVIEN 223-CIP (10504550)

**AMENDMENTS TO THE CLAIMS AMENDMENTS TO THE CLAIMS**

1. (Canceled)
2. (Previously presented) The polarization recovery apparatus comprising:
  - a polarizing beam splitter transmitting a light of a useful polarization in an output direction and reflecting a light of a non-useful polarization in a first orthogonal direction substantially orthogonal to said output direction;
  - an initial reflector disposed reflectably to said orthogonal direction, said initial reflector reflecting said non-useful polarization light in a second orthogonal direction substantially orthogonal to said output direction and said first orthogonal direction;
  - a final reflector disposed reflectably to said second orthogonal direction, said final reflector reflecting said non-useful polarization light in said output direction;
  - a first output reflector disposed reflectably to said output direction, said first output reflector reflecting said useful polarization light in said second orthogonal direction; and
  - a second output reflector disposed reflectably to said second orthogonal direction, said second output reflector reflecting said useful polarization light in said output direction; andwherein said non-useful polarization light is rotated substantially to light of said useful polarization by said initial and final reflectors.
3. (Original) The polarization recovery apparatus of claim 2, wherein said first output reflector is selected from the group consisting of:
  - a prism,
  - a right angle prism,
  - a mismatched impedance, and
  - a mirror.

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4. (Original) The polarization recovery apparatus of claim 2, wherein said first output reflector has a coating that transmits a pre-determined portion of the electro-magnetic radiation spectrum selected from the group consisting of:
- infrared light,
  - visible light,
  - a pre-determined band of wavelengths of light,
  - a specific color of light, and
  - a combination thereof.
5. (Original) The polarization recovery apparatus of claim 2, wherein said second output reflector is selected from the group consisting of:
- a prism,
  - a right angle prism,
  - a mismatched impedance, and
  - a mirror.
6. (Original) The polarization recovery apparatus of claim 2, wherein said second output reflector has a coating that transmits a pre-determined portion of the electro-magnetic radiation spectrum selected from the group consisting of:
- infrared light,
  - visible light,
  - a pre-determined band of wavelengths of light,
  - a specific color of light, and
  - a combination thereof.
- 7-11. (Canceled)
12. (Currently amended) The polarization recovery apparatus ~~of claim 2~~ comprising further: a polarizing beam splitter transmitting a light of a useful polarization in an output direction and reflecting a light of a non-useful polarization in a first orthogonal direction substantially orthogonal to said output direction;

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an initial reflector disposed reflectably to said orthogonal direction, said initial reflector reflecting said non-useful polarization light in a second orthogonal direction substantially orthogonal to said output direction and said first orthogonal direction;

a final reflector disposed reflectably to said second orthogonal direction, said final reflector reflecting said non-useful polarization light in said output direction; and

an output light pipe having an input surface disposed proximate to said output direction and an output surface, said output light pipe receiving said useful polarization light at said input surface and transmitting said useful polarization light at said output surface; and

wherein said non-useful polarization light is rotated substantially to light of said useful polarization by said initial and final reflectors.

13. (previously presented) The polarization recovery apparatus of claim 12, wherein a shape of said input surface is selected from the group consisting of:
- flat,
  - convex,
  - concave,
  - toroidal, and
  - spherical.
14. (Original) The polarization recovery apparatus of claim 12, wherein a shape of said output surface is selected from the group consisting of:
- flat,
  - convex,
  - concave,
  - toroidal, and
  - spherical.
15. (Original) The polarization recovery apparatus of claim 12, wherein said output light pipe is comprised of a material selected from the group consisting of quartz, glass, plastic, or acrylic.

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16. (Previously presented) The polarization recovery apparatus of claim 12, wherein said output light pipe is selected from the group consisting of:
- a straight light pipe (SLP), and
  - a TLP tapered light pipe (TLP).
17. (Canceled)
18. (Currently amended) The polarization recovery apparatus ~~of claim 12~~, comprising:
- a polarizing beam splitter transmitting a light of a useful polarization in an output direction and reflecting a light of a non-useful polarization in a first orthogonal direction substantially orthogonal to said output direction;
  - an initial reflector disposed reflectably to said orthogonal direction, said initial reflector reflecting said non-useful polarization light in a second orthogonal direction substantially orthogonal to said output direction and said first orthogonal direction; and
  - a final reflector disposed reflectably to said second orthogonal direction, said final reflector reflecting said non-useful polarization light in said output direction; and
  - wherein said non-useful polarization light is rotated substantially to light of said useful polarization by said initial and final reflectors; and
  - wherein said initial reflector has a coating that transmits a pre-determined portion of the electro-magnetic radiation spectrum selected from the group consisting of:
    - infrared light,
    - visible light,
    - a pre-determined band of wavelengths of light,
    - a specific color of light, and
    - a combination thereof.
19. (Canceled)
20. (Currently amended) The polarization recovery apparatus ~~of claim 2~~, comprising:
- a polarizing beam splitter transmitting a light of a useful polarization in an output direction and reflecting a light of a non-useful polarization in a first orthogonal direction substantially orthogonal to said output direction;

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an initial reflector disposed reflectably to said orthogonal direction, said initial reflector reflecting said non-useful polarization light in a second orthogonal direction substantially orthogonal to said output direction and said first orthogonal direction; and

a final reflector disposed reflectably to said second orthogonal direction, said final reflector reflecting said non-useful polarization light in said output direction; and

wherein said non-useful polarization light is rotated substantially to light of said useful polarization by said initial and final reflectors; and

wherein said final reflector has a coating that transmits a pre-determined portion of the electro-magnetic radiation spectrum selected from the group consisting of:

infrared light,

visible light,

a pre-determined band of wavelengths of light,

a specific color of light, and

a combination thereof.

21. (Canceled)

22. (Previously presented) The polarization recovery apparatus of claim 2, wherein said shell reflector comprises at least a portion of a shape selected from the group consisting of:

a substantially elliptical surface of revolution,

a substantially spherical surface of revolution, and

a substantially toric surface of revolution.

23. (Currently amended) The polarization recovery apparatus of claim 2, further comprising:  
a polarizing beam splitter transmitting a light of a useful polarization in an output direction and reflecting a light of a non-useful polarization in a first orthogonal direction substantially orthogonal to said output direction;

an initial reflector disposed reflectably to said orthogonal direction, said initial reflector reflecting said non-useful polarization light in a second orthogonal direction substantially orthogonal to said output direction and said first orthogonal direction;

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a final reflector disposed reflectably to said second orthogonal direction, said final reflector reflecting said non-useful polarization light in said output direction;

a shell reflector having a first and a second focal points; and

a source of electro-magnetic radiation disposed proximate to said first focal point of said shell reflector to emit rays of light that reflect from said shell reflector and converge substantially at said second focal point; and

wherein said input surface is disposed proximate to said second focal point to collect and transmit substantially all of said light;

wherein said non-useful polarization light is rotated substantially to light of said useful polarization by said initial and final reflectors; and

wherein said shell reflector comprises:

a primary reflector having a first optical axis, and said first focal point is a focal point of said primary reflector; and

a secondary reflector having a second optical axis placed substantially symmetrically to said primary reflector such that said first and second optical axes are substantially collinear, and wherein said second focal point is a focal point of said secondary reflector; and

wherein said rays of light reflect from said primary reflector toward said secondary reflector and converge substantially at said second focal point.

24. (Original) The polarization recovery apparatus of claim 23, wherein said primary and secondary reflectors each comprise at least a portion of a shape selected from the group consisting of:

a substantially elliptical surface of revolution, and

a substantially parabolic surface of revolution.

25. (Original) The polarization recovery apparatus of claim 23, wherein:

said primary reflector comprises at least a portion of a substantially elliptical surface of revolution; and

said secondary reflector comprises at least a portion of a substantially hyperbolic surface of revolution.

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26. (Original) The polarization recovery apparatus of claim 23, wherein:  
said primary reflector comprises at least a portion of a substantially hyperbolic surface of revolution; and  
said secondary reflector comprises at least a portion of a substantially elliptical surface of revolution.
27. (Original) The polarization recovery apparatus of claim 23, wherein said shell reflector has a coating that transmits a pre-determined portion of the electro-magnetic radiation spectrum selected from the group consisting of:  
infrared light,  
visible light,  
a pre-determined band of wavelengths of light,  
a specific color of light, and  
a combination thereof.
28. (Previously presented) The polarization recovery apparatus of claim 23, further comprising a retro-reflector disposed on a side of said source opposite said shell reflector.
29. (Original) The polarization recovery apparatus of claim 28, wherein said retro-reflector comprises a spherical retro-reflector.
30. (Original) The polarization recovery apparatus of claim 28, wherein said retro-reflector has a coating that transmits a pre-determined portion of the electro-magnetic radiation spectrum selected from the group consisting of:  
infrared light,  
visible light,  
a pre-determined band of wavelengths of light,  
a specific color of light, and  
a combination thereof.

31-39. (Canceled)